

Figure 1 : Metabolic pathway of cysteine and derivatives glutathione and methionine

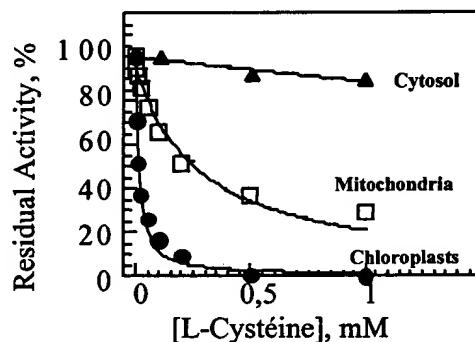


Figure 2 : Effect of cysteine on the activity of serine acetyltransferases from pea
(*Pisum sativum*)

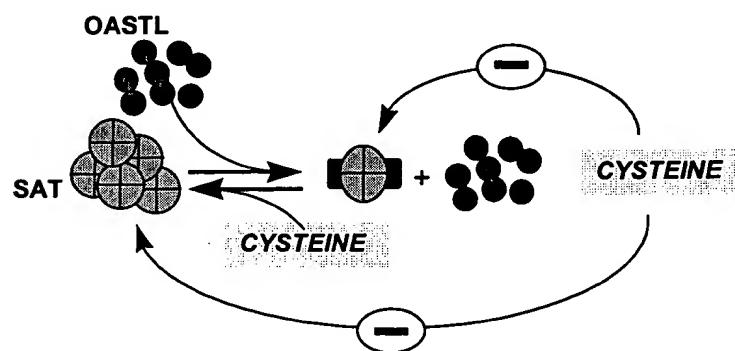


Figure 3 : Model of inhibition of chloroplast serine acetyltransferase



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| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| M | A | T | C | I | D | T | C | R | T | G | N | T | Q | D | D | 16 | |
| ATG | GCA | ACA | TGC | ATA | GAC | ACA | TGC | CGA | ACC | GGT | AAT | ACC | CAA | GAC | GAT | 48 | |
| D | S | R | F | C | C | I | K | N | F | F | R | P | G | F | S | 32 | |
| GAT | TCC | CGG | TTC | TGT | TGC | ATC | AAG | AAT | TTC | TTT | CGA | CCC | GGT | TTC | TCT | 96 | |
| V | N | R | K | I | H | H | T | Q | I | E | D | D | D | D | V | 48 | |
| GTA | AAC | CGG | AAG | ATT | CAC | CAC | ACC | CAA | ATC | GAA | GAT | GAC | GAT | GTC | | 144 | |
| W | I | K | M | L | E | E | A | K | S | D | V | K | Q | E | P | 64 | |
| TGG | ATC | AAG | ATG | CTT | GAA | GAA | GCC | AAA | TCC | GAT | GTT | AAA | CAA | GAA | CCC | 192 | |
| I | L | S | N | Y | Y | Y | A | S | I | T | S | H | R | S | L | 80 | |
| ATT | TTA | TCA | AAC | TAC | TAC | TAC | GCT | TCG | ATC | ACA | TCT | CAT | CGA | TCT | TTA | 240 | |
| E | S | A | L | A | H | I | L | S | V | K | L | S | N | L | N | 96 | |
| GAG | TCT | GCT | TTA | GCT | CAC | ATC | CTC | TCC | GTA | AAG | CTC | AGC | AAT | TTA | AAC | 288 | |
| L | P | S | N | T | L | F | E | L | F | I | S | V | L | E | E | 112 | |
| CTA | CCA | AGC | AAC | ACA | CTC | TTC | GAA | CTG | TTC | ATA | AGC | GTT | TTA | GAA | GAA | 336 | |
| S | P | E | I | I | E | S | T | K | Q | D | L | I | A | V | K | 128 | |
| AGC | CCT | GAG | ATC | ATC | GAA | TCC | ACG | AAG | CAA | GAT | CTT | ATA | GCA | GTC | AAA | 384 | |
| E | R | D | P | A | C | I | S | Y | V | H | C | F | L | G | F | 144 | |
| GAA | AGA | GAC | CCA | GCT | TGT | ATA | AGC | TAC | GTT | CAT | TGC | TTC | TTG | GGC | TTC | 432 | |
| K | G | F | L | A | C | Q | A | H | R | I | A | H | T | L | W | 160 | |
| AAA | GGC | TTC | CTC | GCT | TGT | CAA | GCT | CAT | CGA | ATA | GCT | CAT | ACC | CTC | TGG | 480 | |
| K | Q | N | R | K | I | V | A | L | L | I | Q | N | R | V | S | 176 | |
| AAA | CAG | AAC | AGA | AAA | ATC | GTA | GCT | TTA | TTG | ATC | CAA | AAC | AGA | GTA | TCA | 528 | |
| E | S | F | A | V | D | I | H | P | G | A | K | I | G | K | G | 192 | |
| GAA | TCT | TTC | GCC | GTC | GAT | ATT | CAT | CCC | GGA | GCG | AAG | ATC | GGA | AAA | GGG | 576 | |
| I | L | L | D | H | A | T | G | V | V | I | G | E | T | A | V | 208 | |
| ATT | CTT | TTA | GAC | CAT | GCG | ACG | GGC | GTG | GTG | ATC | GGA | GAG | ACG | GCG | GTG | 624 | |
| V | G | D | N | V | S | I | L | H | G | V | T | L | G | G | T | 224 | |
| GTT | GGA | GAC | AAT | GTT | TCG | ATT | CTA | CAC | GGA | GTG | ACC | TTG | GGA | GGA | ACA | 672 | |
| G | K | Q | S | G | D | R | H | P | K | I | G | D | G | V | L | 240 | |
| GGG | AAA | CAG | AGT | GGT | GAT | CGG | CAT | CCG | AAG | ATT | GGT | GAT | GGT | GTG | TTG | 720 | |
| I | G | A | G | S | C | I | L | G | N | I | T | I | G | E | G | 256 | |
| ATT | GGA | GCT | GGG | AGT | TGT | ATA | TTG | GGG | AAT | ATA | ACA | ATC | GGT | GAG | GGG | 768 | |
| A | K | I | G | S | G | S | V | V | V | K | D | V | P | A | R | 272 | |
| GCT | AAG | ATT | GGA | TCA | GGG | TCG | GTG | GTG | GTT | AAG | GAT | GTG | CCG | GCG | CGT | 816 | |
| T | T | A | V | G | N | P | A | R | L | I | G | G | K | E | N | 288 | |
| ACG | ACG | GCG | GCG | GTT | GGA | AAT | CCG | GCG | AGG | TTG | ATT | GGT | GGG | AAA | GAG | AAT | 864 |
| P | R | K | H | D | K | I | P | C | L | T | M | D | Q | T | S | 304 | |
| CCG | AGA | AAA | CAT | GAT | AAG | ATT | CCT | TGT | CTG | ACT | ATG | GAC | CAG | ACA | TCG | 912 | |
| Y | L | T | E | W | S | D | Y | V | I | | | | | | 314 | | |
| TAT | TTA | ACC | GAG | TGG | TCT | GAT | TAT | GTG | ATT | TAA | | | | | | 945 | |

Figure 4: Nucleotide and protein sequences of the SAT3 (L34076) isoform from *A. thaliana*



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| M | P | P | A | G | E | L | R | H | Q | S | P | S | K | 14 | 42 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
| ATG | CCA | CCG | GCC | GGA | GAA | CTC | CGA | CAT | CAA | TCT | CCA | TCA | AAG | | |
| E | K | L | S | S | V | T | Q | S | D | E | A | E | A | A | S |
| GAG | AAA | CTA | TCT | TCC | GTT | ACC | CAA | TCC | GAT | GAA | GCA | GAA | GCA | GCG | TCA |
| A | A | I | S | A | A | A | A | D | A | E | A | A | G | L | W |
| GCA | GCG | ATA | TCT | GCG | GCA | GCT | GCA | GAT | GCG | GAA | GCT | GCC | GGA | TTA | TGG |
| T | Q | I | K | A | E | A | R | R | D | A | E | A | E | P | A |
| ACA | CAG | ATC | AAG | GCG | GAA | GCT | CGC | CGT | GAT | GCT | GAG | GCG | GAG | CCA | GCT |
| L | A | S | Y | L | Y | S | T | I | L | S | H | S | S | L | E |
| TTA | GCT | AGC | TAT | CTA | TAT | TCG | ACG | ATT | CTT | TCT | CAT | TCG | TCT | CTT | GAA |
| R | S | I | S | F | H | L | G | N | K | L | C | S | S | T | L |
| CGA | TCT | ATC | TCG | TTT | CAT | CTA | GGA | AAC | AAG | CTT | TGT | TCC | TCA | ACG | CTT |
| L | S | T | L | L | Y | D | L | F | L | N | T | F | S | S | D |
| TTA | TCC | ACA | CTT | TTA | TAC | GAT | CTG | TTC | TTA | AAC | ACT | TTT | TCC | TCC | GAT |
| P | S | L | R | N | A | T | V | A | D | L | R | A | A | R | V |
| CCT | TCT | CTT | CGT | AAC | GCC | ACC | GTC | GCA | GAT | CTA | CGC | GCT | GCT | CGT | GTT |
| R | D | P | A | C | I | S | F | S | H | C | L | L | N | Y | K |
| CGT | GAT | CCT | GCT | TGT | ATC | TCG | TTC | TCT | CAT | TGT | CTC | CTC | AAT | TAC | AAA |
| G | F | L | A | I | Q | A | H | R | V | S | H | K | L | W | T |
| GGC | TTC | TTA | GCT | ATT | CAG | GCG | CAT | CGT | GTA | TCA | CAC | AAG | CTA | TGG | ACA |
| Q | S | R | K | P | L | A | L | A | L | H | S | R | I | S | D |
| CAA | TCA | CGG | AAG | CCA | TTA | GCA | TTA | GCT | CTA | CAC | TCA | AGA | ATC | TCC | GAT |
| V | F | A | V | D | I | H | P | A | A | K | I | G | K | G | I |
| GTA | TTC | GCT | GTT | GAT | ATC | CAT | CCA | GCA | GCG | AAG | ATC | GGG | AAA | GGG | ATA |
| L | L | D | H | A | T | G | V | V | V | G | E | T | A | V | I |
| CTT | CTA | GAC | CAC | GCA | ACC | GGA | GTT | GTA | GTC | GGA | GAA | ACA | GCG | GTG | ATT |
| G | N | N | V | S | I | L | H | H | V | T | L | G | G | T | G |
| GGG | AAC | AAT | GTT | TCA | ATC | CTT | CAC | CAT | GTG | ACA | CTA | GGT | GGA | ACA | GGT |
| K | A | C | G | D | R | H | P | K | I | G | D | G | C | L | I |
| AAA | GCT | TGT | GGA | GAT | AGA | CAT | CCG | AAG | ATC | GGT | GAC | GGT | TGT | TTG | ATT |
| G | A | G | A | T | I | L | G | N | V | K | I | G | A | G | A |
| GGA | GCT | GGA | GCG | ACT | ATT | CTT | GGA | AAT | GTG | AAG | ATT | GGT | GCA | GGT | GCT |
| K | V | G | A | G | S | V | V | L | I | D | V | P | C | R | G |
| AAA | GTA | GGA | GCT | GGT | TCT | GTT | GTG | CTG | ATT | GAC | GTG | CCT | TGT | CGA | GGT |
| T | A | V | G | N | P | A | R | L | V | G | G | K | E | K | P |
| ACT | GCG | GTT | GGG | AAT | CCG | GCG | AGA | CTT | GTC | GGA | GGG | AAA | GAG | AAG | CCA |
| T | I | H | D | E | E | C | P | G | E | S | M | D | H | T | S |
| ACG | ATT | CAT | GAT | GAG | GAA | TGT | CCT | GGA | GAA | TCG | ATG | GAT | CAT | ACT | TCA |
| F | I | S | E | W | S | D | Y | I | I... | | | | | | |
| TTC | ATC | TCG | GAA | TGG | TCA | GAT | TAC | ATC | ATA | TAA | | | | | |
| | | | | | | | | | | | | | | | 939 |
| | | | | | | | | | | | | | | | 312 |

Figure 5: Nucleotide and protein sequences of the SAT3' (U30298) isoform from *A. thaliana*



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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|
| M | A | A | C | I | D | T | C | R | T | G | K | P | Q | I | 15 | |
| ATG | GCT | GCG | TGC | ATC | GAC | ACC | TGC | CGC | ACT | GGT | AAA | CCC | CAG | ATT | 45 | |
| S | P | R | D | S | S | K | H | H | D | D | E | S | G | F | 30 | |
| TCT | CCT | CGC | GAT | TCT | TCT | AAA | CAC | CAC | GAC | GAT | GAA | TCT | GGC | TTT | 90 | |
| R | Y | M | N | Y | F | R | Y | P | D | R | S | S | F | N | 45 | |
| CGT | TAC | ATG | AAC | TAC | TTC | CGT | TAT | CCT | GAT | CGA | TCT | TCC | TTC | AAT | 135 | |
| G | T | Q | T | K | T | L | H | T | R | P | L | L | E | D | 60 | |
| GGA | ACC | CAG | ACC | AAA | ACC | CTC | CAT | ACT | CGT | CCT | TTG | CTT | GAA | GAT | 180 | |
| L | D | R | D | A | E | V | D | D | V | W | A | K | I | R | 75 | |
| CTC | GAT | CGC | GAC | GCT | GAA | GTC | GAT | GAT | GTT | TGG | GCC | AAA | ATC | CGA | 225 | |
| E | E | A | K | S | D | I | A | K | E | P | I | V | S | A | 90 | |
| GAA | GAG | GCT | AAA | TCT | GAT | ATC | GCC | AAA | GAA | CCT | ATT | GTT | TCC | GCT | 270 | |
| Y | Y | H | A | S | I | V | S | Q | R | S | L | E | A | A | 105 | |
| TAT | TAT | CAC | GCT | TCG | ATT | GTT | TCT | CAG | CGT | TCG | TTG | GAA | GCT | GCG | 315 | |
| L | A | N | T | L | S | V | K | L | S | N | L | N | L | P | 120 | |
| TTG | GCG | AAT | ACT | TTA | TCT | GTT | AAA | CTC | AGC | AAT | TTG | AAT | CTT | CCA | 360 | |
| S | N | T | L | F | D | L | F | S | G | V | L | Q | G | N | 135 | |
| AGC | AAC | ACG | CTT | TTC | GAT | TTG | TTC | TCT | GGT | GTT | CTT | CAA | GGA | AAC | 405 | |
| P | D | I | V | E | S | V | K | L | D | L | L | A | V | K | 150 | |
| CCA | GAT | ATT | GTT | GAA | TCT | GTC | AAG | CTA | GAT | CTT | TTA | GCT | GTT | AAG | 450 | |
| E | R | D | P | A | C | I | S | Y | V | H | C | F | L | H | 165 | |
| GAG | AGA | GAT | CCT | GCT | TGT | ATA | AGC | TAC | GTT | CAT | TGT | TTC | CTT | CAC | 495 | |
| F | K | G | F | L | A | C | Q | A | H | R | I | A | H | E | 180 | |
| TTT | AAA | GGC | TTC | CTC | GCT | TGT | CAA | GCG | CAT | CGT | ATT | GCT | CAT | GAG | 540 | |
| L | W | T | Q | D | R | K | I | L | A | L | L | I | Q | N | 195 | |
| CTT | TGG | ACT | CAG | GAC | AGA | AAA | ATC | CTA | GCT | TTG | TTG | ATC | CAG | AAC | 585 | |
| R | V | S | E | A | F | A | V | D | F | H | P | G | A | K | 210 | |
| AGA | GTC | TCT | GAA | GCC | TTC | GCT | GTT | GAT | TTC | CAC | CCT | GGA | GCT | AAA | 630 | |
| I | G | T | G | I | L | L | D | H | A | T | A | I | V | I | 225 | |
| ATC | GGT | ACC | GGG | ATT | TTG | CTA | GAC | CAT | GCT | ACG | GCT | ATT | GTG | ATC | 675 | |
| G | E | T | A | V | V | G | N | N | V | S | I | L | H | N | 240 | |
| GGT | GAG | ACG | GCG | GTT | GTG | GGG | AAC | AAT | GTT | TCG | ATT | CTC | CAT | AAC | 720 | |
| V | T | L | G | G | T | G | K | Q | C | G | D | R | H | P | 255 | |
| GTT | ACG | CTT | GGG | GGG | ACG | GGG | AAA | CAG | TGT | GGA | GAT | AGG | CAC | CCG | 765 | |
| K | I | G | D | G | V | L | I | G | A | G | T | C | I | L | 270 | |
| AAG | ATT | GGC | GAT | GGG | GTT | TTG | ATT | GGA | GCT | GGG | ACT | TGT | ATT | TTG | 810 | |
| G | N | I | T | I | G | E | G | A | K | I | G | A | G | S | 285 | |
| GGG | AAT | ATC | ACG | ATT | GGT | GAA | GGG | GCT | AAG | ATT | GGT | GCG | GGG | TCG | 855 | |
| V | V | L | K | D | V | P | P | R | T | T | A | V | G | N | 300 | |
| G | TG | G | TG | AAA | GAC | GTG | CCG | CCG | CGT | ACG | ACG | GCT | GTT | GGA | AAT | 900 |
| P | A | R | L | L | G | G | K | D | N | P | K | T | H | D | 315 | |
| CCG | GCG | AGG | TTG | CTT | GGT | GGT | AAA | GAT | AAT | CCG | AAA | ACG | CAT | GAC | 945 | |
| K | I | P | G | L | T | M | D | Q | T | S | H | I | S | E | 330 | |
| AAG | ATT | CCT | GGT | TTG | ACT | ATG | GAC | CAG | ACG | TCG | CAT | ATA | TCC | GAG | 990 | |
| W | S | D | Y | V | I | | | | | | | | | | 336 | |
| TGG | TCG | GAT | TAT | GTA | ATT | TGA | | | | | | | | | 1011 | |

Figure 6: Nucleotide and protein sequences of the SAT 1' (L78443) isoform from *A. thaliana*.



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| | M | L | P | V | T | S | R | R | H | F | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| | ATG | TTG | CCG | GTC | ACA | AGT | CGC | CGC | CAC | TTC | 10 |
| T | M | S | L | Y | M | L | R | S | S | P | 30 |
| A | C | A | T | T | A | T | G | T | C | A | 25 |
| C | A | T | G | T | C | T | C | T | C | A | 75 |
| A | T | G | T | C | T | G | T | C | A | 40 | 40 |
| T | C | A | T | T | C | T | T | T | T | A | 120 |
| C | T | C | A | T | C | T | T | T | T | A | 55 |
| A | T | G | T | C | T | G | T | T | T | A | 165 |
| T | C | A | T | T | C | C | C | C | C | C | 70 |
| C | A | T | G | T | C | T | G | K | P | Q | 210 |
| A | T | G | T | C | A | T | G | T | A | C | 85 |
| T | C | A | T | T | C | C | T | C | G | F | 255 |
| C | A | T | G | T | C | G | A | A | A | 100 | 100 |
| A | T | G | T | C | A | C | C | C | C | A | 300 |
| T | C | A | T | T | C | T | G | T | T | T | 115 |
| C | A | T | G | T | C | G | A | T | C | A | 345 |
| A | T | G | T | C | A | T | G | T | T | G | 130 |
| T | C | A | T | T | C | C | G | T | T | A | 390 |
| C | A | T | G | T | C | G | A | A | A | 145 | 145 |
| A | T | G | T | C | A | T | G | T | T | G | 435 |
| T | C | A | T | T | C | C | T | T | T | G | 160 |
| C | A | T | G | T | C | G | A | A | A | 480 | 480 |
| A | T | G | T | C | A | T | G | T | T | G | 175 |
| T | C | A | T | T | C | C | T | T | L | P | 525 |
| C | A | T | G | T | C | G | A | A | A | 190 | 190 |
| A | T | G | T | C | A | T | G | T | T | G | 570 |
| T | C | A | T | T | C | C | T | T | C | A | 205 |
| C | A | T | G | T | C | G | A | A | A | 615 | 615 |
| A | T | G | T | C | A | T | G | T | T | G | 220 |
| T | C | A | T | T | C | C | T | T | C | A | 660 |
| C | A | T | G | T | C | G | A | A | A | 235 | 235 |
| A | T | G | T | C | A | T | G | T | T | G | 705 |
| T | C | A | T | T | C | C | T | T | T | G | 250 |
| C | A | T | G | T | C | G | A | A | A | 750 | 750 |
| A | T | G | T | C | A | T | G | T | T | G | 265 |
| T | C | A | T | T | C | C | T | T | C | A | 795 |
| C | A | T | G | T | C | G | A | A | A | 840 | 840 |
| A | T | G | T | C | A | T | G | T | T | G | 295 |
| T | C | A | T | T | C | C | T | T | C | A | 885 |
| C | A | T | G | T | C | G | A | A | A | 310 | 310 |
| A | T | G | T | C | A | T | G | T | T | G | 930 |
| T | C | A | T | T | C | C | T | T | C | A | 325 |
| C | A | T | G | T | C | G | A | A | A | 975 | 975 |
| A | T | G | T | C | A | T | G | T | T | G | 340 |
| T | C | A | T | T | C | C | T | T | C | A | 1020 |
| C | A | T | G | T | C | G | A | A | A | 355 | 355 |
| A | T | G | T | C | A | T | G | T | T | G | 1065 |
| T | C | A | T | T | C | C | T | T | C | A | 370 |
| C | A | T | G | T | C | G | A | A | A | 1110 | 1110 |
| A | T | G | T | C | A | T | G | T | T | G | 385 |
| T | C | A | T | T | C | C | T | T | C | A | 1155 |
| C | A | T | G | T | C | G | A | A | A | 391 | 391 |
| A | T | G | T | C | A | T | G | T | T | G | 1176 |
| T | C | A | T | T | C | C | T | T | C | A | |

Figure 7 : Nucleotide and protein sequences of the SAT 1 (U 22964) isoform from *A. thaliana*



| M | V | D | L | S | S | F | S | L | L | F | A | F | S | V | S | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| ATG | GTG | GAT | CTA | TCT | TCC | TTT | AGC | CTC | CTT | TTT | GCT | TTC | TCC | GTC | TCT | 16 |
| L | S | F | V | Q | S | K | R | V | C | D | S | S | L | S | S | 48 |
| P | W | R | D | M | N | G | D | E | L | P | F | E | S | G | F | 32 |
| CCT | TGG | AGA | GAT | ATG | AAT | GGC | GAT | GAG | CTT | CCT | TTC | GAG | AGT | GGT | TTC | 96 |
| E | V | Y | A | K | G | T | H | K | S | E | F | D | S | N | L | 48 |
| GAG | GTT | TAC | GCT | AAG | GGA | ACT | CAT | AAG | TCA | GAG | TTT | GAC | TCG | AAT | TTG | 144 |
| L | D | P | R | S | D | P | I | W | D | A | I | R | E | E | A | 64 |
| CTT | GAT | CCT | CGT | TCT | GAT | CCT | ATT | TGG | GAT | GCT | ATA | AGA | GAA | GAA | GCT | 192 |
| K | L | E | A | E | K | E | P | I | L | S | S | F | L | Y | A | 80 |
| AAA | CTT | GAG | GCA | GAG | AAA | GAG | CCT | ATT | TTG | AGT | AGC | TTC | TTG | TAT | GCT | 240 |
| G | I | L | A | H | D | C | L | E | Q | A | L | G | F | V | L | 288 |
| GGT | ATC | TTA | GCA | CAT | GAT | TGT | TTA | GAG | CAA | GCT | TTA | GGG | TTT | GTT | CTA | 112 |
| A | N | R | L | Q | N | P | T | L | L | A | T | Q | L | L | D | 336 |
| GCC | AAC | CGT | CTC | CAA | AAC | CCA | ACC | TTG | TTG | GCA | ACA | CAA | CTC | TTG | GAT | 128 |
| I | P | Y | G | V | M | M | H | D | K | G | I | Q | S | S | I | 384 |
| ATA | TTT | TAT | GGT | GTT | ATG | ATG | CAT | GAC | AAA | GGT | ATT | CAG | AGT | TCG | ATT | 144 |
| R | H | D | L | Q | A | F | K | D | R | D | P | A | C | L | S | 432 |
| CGC | CAT | GAT | CTC | CAG | GCA | TTT | AAA | GAT | CGT | GAT | CCT | GCT | TGT | CTG | TCG | 160 |
| Y | S | S | A | I | L | H | L | K | G | Y | H | A | L | Q | A | 480 |
| TAT | AGT | TCT | GCT | ATT | TTA | CAT | CTG | AAG | GGT | TAT | CAT | GCG | TTA | CAA | GCA | 176 |
| Y | R | V | A | H | K | L | W | N | E | G | R | K | L | L | A | 528 |
| TAT | AGG | GTT | GCG | CAT | AAA | CTG | TGG | AAT | GAA | GGG | AGG | AAA | CTA | TTA | GCT | 192 |
| L | A | L | Q | S | R | I | S | E | V | F | G | I | D | I | H | 576 |
| CTT | GCA | TTG | CAA | AGC | CGA | ATA | AGC | GAG | GTT | TTT | GGC | ATT | GAC | ATA | CAT | 208 |
| P | A | A | R | I | G | E | G | I | L | L | D | H | G | T | G | 624 |
| CCA | GCG | GCA | AGA | ATT | GGG | GAG | GGG | ATA | TTG | TTG | GAT | CAT | GGA | ACT | GGA | 224 |
| V | V | I | G | E | T | A | V | I | G | N | G | V | S | I | L | 672 |
| GTG | GTC | ATT | GGT | GAG | ACC | GCT | GTG | ATA | GGC | AAC | GGT | GTC | TCG | ATC | TTA | 240 |
| H | G | V | T | L | G | G | T | G | K | E | T | G | D | R | H | 720 |
| CAT | GGT | GTG | ACT | TTA | GGG | GGG | ACC | GGG | AAG | GAA | ACT | GGC | GAT | CGC | CAC | 256 |
| P | K | I | G | E | G | A | L | L | G | A | C | V | T | I | L | 768 |
| CCA | AAG | ATA | GGT | GAA | GGT | GCA | TTG | CTT | GGG | GCT | TGT | GTG | ACT | ATA | CTT | 272 |
| G | N | I | S | I | G | A | G | A | M | V | A | A | G | S | L | 816 |
| GGT | AAC | ATA | AGC | ATA | GGT | GCT | GGG | GCA | ATG | GTA | GCT | GCA | GGT | TCA | CTT | 288 |
| V | L | K | D | V | P | S | H | S | V | V | A | G | N | P | A | 864 |
| GTG | TTA | AAA | GAC | GTT | CCT | TCG | CAT | AGT | GTG | GTG | GCT | GGG | AAT | CCT | GCA | 304 |
| K | L | I | R | V | M | E | E | Q | D | P | S | L | A | M | K | 912 |
| AAA | CTG | ATC | AGG | GTC | ATG | GAA | GAG | CAA | GAC | CCG | TCT | CTA | GCA | ATG | AAA | 320 |
| H | D | A | T | K | E | F | F | R | H | V | A | D | G | Y | K | 960 |
| CAC | GAT | GCT | ACT | AAA | GAG | TTC | TTT | CGA | CAT | GTA | GCT | GAT | GGT | TAC | AAA | 336 |
| G | A | Q | S | N | G | P | S | L | S | A | G | D | T | E | K | 1008 |
| GGG | GCA | CAA | TCT | AAC | GGG | CCA | TCA | CTT | TCA | GCA | GGG | GAT | ACA | GAG | AAA | 352 |
| G | H | T | N | S | T | S | | | | | | | | | | 1056 |
| GGA | CAC | ACT | AAC | AGC | ACA | TCA | TGA | | | | | | | | | 359 |
| | | | | | | | | | | | | | | | | 1104 |

Figure 8: Nucleotide and protein sequences from mRNA of the putative chloroplast serine acetyltransferase SAT2 from *Arabidopsis thaliana* (L78444)



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| M | A | C | I | N | G | E | N | R | D | F | S | S | S | S | 15 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ATG | GCT | TGT | ATA | AAC | GGC | GAG | AAT | CGT | GAT | TTT | TCT | TCC | TCG | TCA | 45 |
| S | L | S | S | L | P | M | I | V | S | R | N | F | S | A | 30 |
| TCT | TTG | TCT | TCT | CTT | CCA | ATG | ATT | GTC | TCC | CGG | AAC | TTT | TCT | GCC | 90 |
| R | D | D | G | E | T | G | D | E | F | P | F | E | R | I | 45 |
| AGA | GAC | GAT | GGA | GAG | ACC | GGT | GAC | GAG | TTT | CCT | TTC | GAG | AGG | ATT | 135 |
| F | P | V | Y | A | R | G | T | L | N | P | V | A | D | P | 60 |
| TTC | CCG | GTT | TAC | GCT | AGA | GGA | ACC | CTT | AAT | CCC | GTG | GCC | GAC | CCG | 180 |
| V | L | L | D | F | T | N | S | S | Y | D | P | I | W | D | 75 |
| GTT | TTG | CTG | GAT | TTT | ACC | AAT | TCT | AGT | TAT | GAC | CCA | ATT | TGG | GAT | 225 |
| S | I | R | E | E | A | K | L | E | A | E | E | E | P | V | 90 |
| TCT | ATA | AGA | GAA | GAA | GCT | AAG | CTT | GAG | GCA | GAA | GAG | GAG | CCG | GTT | 270 |
| L | S | S | F | L | Y | A | S | I | L | S | H | D | C | L | 105 |
| TTG | AGT | AGC | TTC | TTG | TAT | GCT | AGT | ATC | TTG | TCG | CAT | GAC | TGT | TTA | 315 |
| E | Q | A | L | S | F | V | L | A | N | R | L | Q | N | P | 120 |
| GAG | CAA | GCA | TTG | AGT | TTT | GTT | CTA | GCT | AAC | CGT | CTC | CAA | AAC | CCT | 360 |
| T | L | L | A | T | Q | L | M | D | I | F | C | N | V | M | 135 |
| ACC | TTG | TTG | GCA | ACT | CAG | CTT | ATG | GAT | ATA | TTT | TGC | AAC | GTT | ATG | 405 |
| V | H | D | R | G | I | Q | S | S | I | R | L | D | V | Q | 150 |
| GTA | CAT | GAC | AGA | GGT | ATT | CAA | AGC | TCG | ATT | CGT | CTT | GAT | GTT | CAG | 450 |
| A | F | K | D | R | D | P | A | C | L | S | Y | S | S | A | 165 |
| GCA | TTC | AAA | GAC | AGA | GAT | CCT | GCT | TGT | CTA | TCG | TAT | AGT | TCG | GCT | 495 |
| I | L | H | L | K | G | Y | L | A | L | Q | A | Y | R | V | 180 |
| ATT | TTA | CAT | CTG | AAG | GGC | TAT | CTT | GCA | CTG | CAG | GCG | TAT | AGA | GTA | 540 |
| A | H | K | L | W | K | Q | G | R | K | L | L | A | L | A | 195 |
| GCA | CAT | AAG | TTG | TGG | AAG | CAA | GGA | AGA | AAA | CTA | TTA | GCA | TTG | GCA | 585 |
| L | Q | S | R | V | S | E | V | R | T | A | V | I | G | D | 210 |
| CTG | CAA | AGC | CGA | GTA | AGC | GAG | GTA | AGA | ACT | GCT | GTG | ATA | GGC | GAC | 630 |
| R | V | S | I | L | H | G | V | T | L | G | G | T | G | K | 225 |
| CGT | GTC | TCA | ATT | TTG | CAT | GGT | GTG | ACA | TTA | GGA | GGA | ACT | GGG | AAA | 675 |
| E | T | G | D | R | H | P | N | I | G | D | G | A | L | L | 240 |
| GAA | ACC | GGT | GAC | CGC | CAT | CCA | AAT | ATA | GGC | GAC | GGT | GCT | CTT | CTT | 720 |
| G | A | C | V | T | I | L | G | N | I | K | I | G | A | G | 255 |
| GGA | GCA | TGT | GTG | ACT | ATA | CTT | GGT | AAC | ATT | AAG | ATA | GGC | GCT | GGA | 765 |
| A | M | V | A | A | G | S | L | V | L | K | D | V | P | S | 270 |
| GCA | ATG | GTA | GCT | GCT | GGT | TCG | CTT | GTG | TTA | AAG | GAT | GTT | CCT | TCG | 810 |
| H | S | M | V | A | G | N | P | A | K | L | I | G | F | V | 285 |
| CAT | AGC | ATG | GTG | GCT | GGA | AAT | CCA | GCA | AAA | CTC | ATC | GGG | TTT | GTT | 855 |
| D | E | Q | D | P | S | M | T | M | E | H | G | E | S | 299 | |
| GAT | GAG | CAA | GAT | CCA | TCT | ATG | ACA | ATG | GAG | CAT | GGT | GAG | TCT | TGA | 900 |

Figure 9:Nucleotide and amino acid sequences from mRNA of the putative chloroplast SAT4 from *Arabidopsis thaliana*



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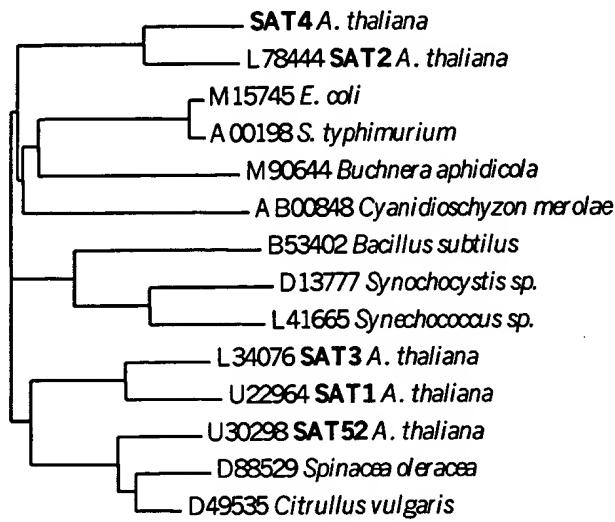


Figure 10 Sequence comparison of serine acetyltransferases from *A. thaliana* and other organisms

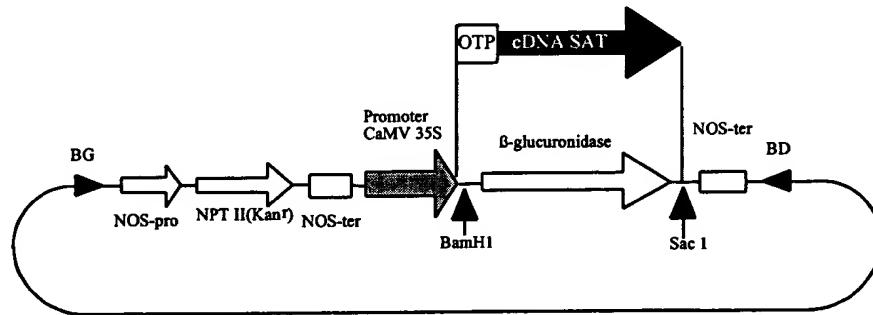


Figure 11: Process for insertion of OTP/serine acetyltransferase SAT3 or cysteine-insensitive SAT such as truncated SAT1 in the vector pBI121

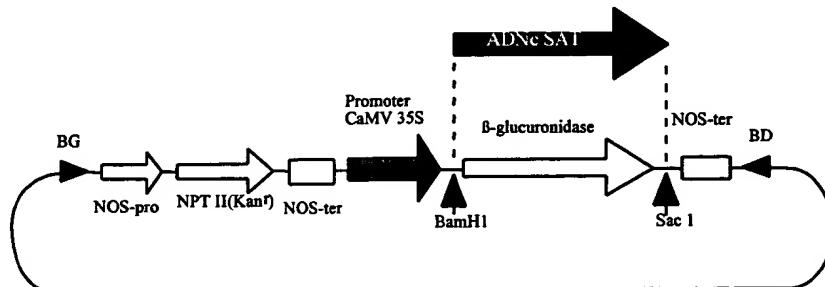


Figure 12: Process for insertion of serine acetyltransferase SAT1', SAT1, SAT2, SAT3, SAT3', SAT4 or any SAT in the vector pBI121



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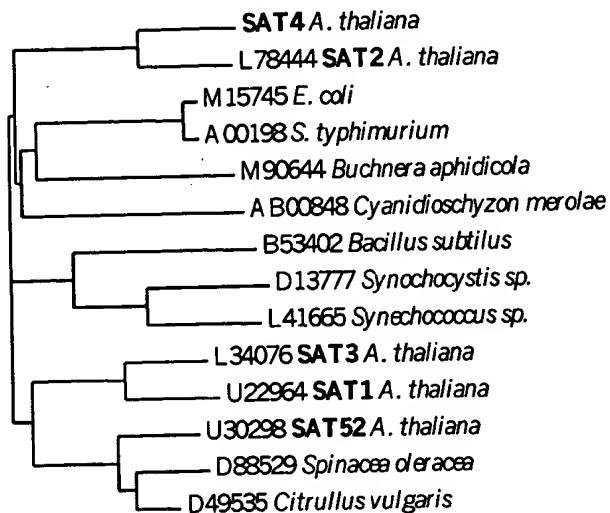


Figure 10 Sequence comparison of serine acetyltransferases from *A. thaliana* and other organisms

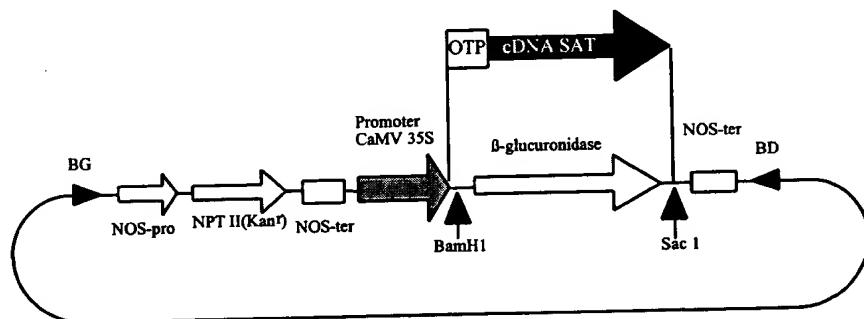


Figure 11: Process for insertion of OTP/serine acetyltransferase SAT3 or cysteine-insensitive SAT such as truncated SAT1 in the vector pBI121

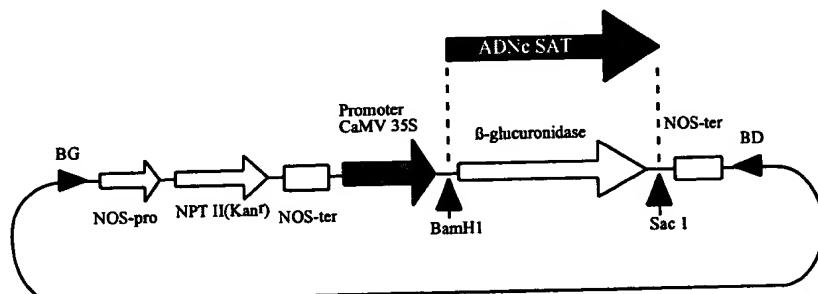


Figure 12: Process for insertion of serine acetyltransferase SAT1', SAT1, SAT2, SAT3, SAT3', SAT4 or any SAT in the vector pBI121